Claims:

1. a communications device, comprising:

a transmitting chaotic circuit with at least one circuit element, the value of which affects a chaotic electrical property of said chaotic circuit;

said at least one circuit element having multiple component elements, at least one of which is isolated from said chaotic circuit by a switch such that when said switch is switched to a first state, said value has a first magnitude and when said switch is switched to a second state, said value has a second magnitude;

said chaotic property being applicable to a communications channel such that said chaotic property is detectable by a receiver signally connected to said communications channel, whereby said property forms a chaotic carrier signal;

said switch being controllable responsively to an information signal, whereby said chaotic carrier signal is modulated by said information signal.

2. a device as in claim 1, wherein said at least one circuit element is a capacitance.

3. a device as in claim 1, wherein said switch is a field effect transistor (FET).

4. a device as in claim 3, wherein said FET is an optoisolator.

5. a device as in claim 1, further comprising a controller programmed to decompose an information signal into successive actuations of said switch to encode said information signal by modulating said chaotic carrier.

6. a device as in claim 1, wherein said transmitting chaotic circuit includes a Chua circuit.

7. a communications device, comprising:

a transmitting chaotic circuit configurable responsively to an information signal such that said transmitting chaotic circuit produces at least three different chaotic signals, each being characterized by a different trajectory-versus-time

characteristic;

a receiver with an oscillating subportion to which said at least three different chaotic signals can be applied to drive said oscillating subportion;

a beat detector connected to said oscillating subportion to detect a difference between a fundamental frequency of said oscillating subportion and a current one of said at least three different chaotic signals, whereby said information signal is detected by said beat detector.

8. a device as in claim 7, wherein said beat detector includes a fast Fourier transform calculator.

9. a device as in claim 7, wherein said oscillating subportion includes a tank circuit.

10. a device as in claim 9, wherein said transmitting chaotic circuit is configurable by selectively isolating and connecting circuit elements thereof to vary at least one of a capacitance, an inductance, and a resistance.

11. a device as in claim 7, wherein said chaotic circuit is a configurable Chua circuit.

12. a device as in claim 11, wherein:

each of said at least three different chaotic signals corresponds to a separate configuration of said chaotic circuit;

said Chua circuit includes a tank circuit with a capacitor with a capacitance C_2, and an inductor with inductance L, coupled to a non-linear resistance element through a resistor with resistance R;

the values of said inductance, said capacitance, and said resistance, of all of said separate configurations are characterized by equal values of $\alpha=C_1/C_2$ and $\beta=R^2C_2/L$.

13. a communications receiver, comprising:

a chaotic oscillator having a oscillator portion and a chaotic portion with a

non-linear resistance element such that when said oscillator and chaotic portions are coupled, they form a chaotic oscillator;

said oscillator portion and said chaotic portion being coupled to pass a current signal therebetween;

said oscillator portion being signally coupled to a communications medium carrying a modulated chaotic signal; and

said chaotic portion being signally coupled directly to said communications medium such that a voltage of said communications medium is directly applied to said chaotic portion through a circuit path parallel to a coupling allowing said current signal to pass between said oscillator portion and said chaotic portion.

14. a device as in claim 13, further comprising:

a comparator having a first input coupled to said communications channel and a second input coupled to said chaotic portion, whereby an output of said comparator indicates, by nominal zero levels, a difference between a frequency characterizing said modulated chaotic signal and a frequency of said chaotic portion;

said chaotic portion being coupled to said communications medium through a resistor bridging said first and second inputs of said comparator.

15. a device as in claim 14, wherein said chaotic portion includes a capacitor coupled to said non-linear resistance element.

16. a device as in claim 14, wherein said oscillator portion includes a tank circuit.

17. a device as in claim 14, further comprising a beat detector coupled to said comparator output.

18. a device as in claim 14, further comprising a counting circuit connected to said comparator output.

19. A communications device, comprising:

a chaotic oscillator connectable to a communications channel;

said chaotic oscillator having a tank circuit with at least two capacitors and an inductor;

a first of said at least two capacitors being connected to an inductor and a second of said at least two capacitors being selectively connectable to said inductor to combine respective capacitances of said at least two capacitors through a switch;

said switch having an input for accepting an information signal, whereby said chaotic oscillator is selectively alternated between at least two oscillating regimes and thereby modulated in accord with said information signal to generate chaotic signal which at each instant oscillates according to a selected one of said oscillating regimes;

a receiver signally coupled to said communications channel; and

said receiver having a receiving chaotic oscillator portion for each of said at least two oscillating regimes, each portion being configured to synchronize with a respective one of said at least two chaotic signals.

20. A device as in claim 19, further comprising a detector connected to detect which of said at least two receiving chaotic oscillators is currently synchronized and to generate an output indicating the same such that said information signal is recovered from said chaotic signals.

21. A communications system, comprising:

transmitting and receiving Chua circuits;

at least one component of said transmitting Chua circuit including at least two subcomponents, at least one of which being selectively isolated from said transmitting Chua circuit by a switch such that a current oscillating regime of said transmitting Chua circuit is selectively alternated between at least two respective

oscillating regimes;

said switch being switchable responsively to an information signal;

values of said at least two subcomponents together with a configuration of said switch being such that one of said at least two oscillating regimes is substantially the same as an oscillating regime of said receiving Chua circuit, whereby said receiving Chua circuit is synchronizable with said transmitting Chua circuit when said current oscillating regime is said one of said at least two oscillating regimes;

a detector connected to detect when said receiving Chua circuit is in synchrony with a chaotic signal generated by said transmitting Chua circuit, whereby said information signal may be recovered from said chaotic signal.

22. A chaotic communications system, comprising:

a transmitter;

a receiver;

said transmitter having first and second subsystems, said first subsystem being connected to apply a first signal generated in said first subsystem to said second subsystem;

said receiver having third and fourth subsystems, said third subsystem being connected to apply a third signal generated in said third subsystem to said fourth subsystem;

said second subsystem being connected to apply a second signal generated in said second subsystem to said first subsystem;

one of said first subsystem and said second subsystem being drivable by one of an external driving signal, an external current source, and a pre-established initial state where said first and second subsystems are lossless where said first and second subsystems are generated numerically by a computer;

said first and second subsystems being configured such that a chaotic

oscillation is maintained therebetween, whereby said first and second signals are chaotic,

said transmitter further including a modulator responsive to an external information signal connected such that said chaotic oscillation is perturbed and a modulated signal derived thereby or a signal derived from said chaotic oscillation unperturbed is augmented such that said signal is modulated;

said transmitted second signal being connectable through a communication channel connectable to said third subsystem, whereby a received version of said second signal is applied to said third subsystem;

said receiver also having a synchronizing filter for applying a filtered version of said received second signal to said fourth subsystem;

said receiver having a decoder connected to derive a received information signal from said received second signal by comparing said received second signal to a signal inhering in said receiver.